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ABSTRACT

A neurodevelopmental treatment approach provides severely physically/profoundly retarded adults (over 21-years-old) with opportunities for learning functional abilities that may lead to placement in group homes. The adults, who have recently been deinstitutionalized, are worked with, in terms of postural reflexes and passive and active movement, in gradually more normal patterns. Decisions must be made over form vs. function, especially for adults who may have had very little prior sensory experience stimulation in the institution. Neurodevelopmental therapy, which stresses form, without goal directed activity will not help the clients become more functionally independent. The combination of neurodevelopmental therapy with instructional programing for independent functioning can be an effective approach. (CL)

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Form versus Function: Neurodevelopmental Treatment In Relation To An Over Twenty-One Deinstitutionalized Population

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The Program

The issue of form versus function in relation to neurodevelopmental treatment is particularly relevant when providing instructional programming for severely physically handicapped/profoundly retarded individuals over the age of twenty-one. This paper focuses on a specific over-twenty-one-years-of-age population recently deinstitutionalized from a large institution where neither form nor function, in terms of learning, was ever a consideration in any positive sense of the words.

As a result of federally mandated legislation these clients are currently residing at Flower Hospital, designated as a "specialty hospital," the only one of its kind in the country. One of the criteria for placement in this hospital is that each client requires a critical amount of medical attention which they could not receive in a less restrictive environment. While living at the hospital they receive a spectrum of services including education, therapy and medical. Younger clients (up to 21 years) have been receiving educational services since this program started. The administrative staff recently decided to implement educational services for clients older than twenty-one (the oldest client is 33 years of age). Hence, a psycho-educational model within a medical framework is the basis for client habilitation.

For purposes of clarity in defining this specific over twenty-one population, the clients focused on exhibit as a group the following handicaps: non-ambulation, severe physical

involvement (contractures in lower extremities, limited mobility in upper extremities, subluxed and dislocated hips, scoliosis and osteoporosis), atypical postural tone, atypical patterns of movement, retention of reflexive behaviors, poor respiration, hearing and visual impairments, and cognitive ability representative of the first two stages of Piaget's sensorimotor development. In essence, they have had no sensory input their entire lives until three years ago.

The program setting at Flower Hospital has six clients per classroom, a teacher and one direct care staff. The clients receive a mandated six hours of educational programming, three of which account for therapeutic feeding at meal times. A teacher may choose to implement as many programs as he/she feels appropriate per client and has the physical motivation to carry out, collect data, and record during three hours of actual classroom time. Therapeutic staff come into the classroom at designated times to implement their programs with specific clients. Their programs are typically not associated with teacher programs. Although there is much interaction and discussion of client needs between teacher and therapist, what generally happens is that teachers position and carry out functional programs without regard for therapeutic intervention and therapists implement movement and handling interventions without regard for functional skill. This attempt at interdisciplinary programming, contingent on a client becoming medically stable, leads to the hospital's ultimate goal of placement in a group or foster home.

Neurodevelopmental Treatment

The basic concept of neurodevelopmental treatment for teaching motorically impaired individuals incorporates the understanding that a) normal maturation of the brain is obstructed by a lesion, causing delayed motor and cognitive development, and b) there exists atypical patterns of posture and movement as a result of atypical postural reflex activity (Bobath). In addition it is imperative to understand the role postural tone plays in influencing an individual's movement ability.

Treatment approach utilizes the concepts of facilitation and inhibition through handling techniques in order to normalize an individuals tone and patterns of movement for optimal functional ability. For example, through various "hands-on" techniques an instructor might work to inhibit a child's asymmetrical tonic neck reflex to facilitate bilateral hand function at midline. We are decreasing an atypical pattern of movement in order to increase a more normal functional one.

Facilitation of movement is achieved by controlling the important proximal body parts: head/neck, shoulders, and hip/pelvis areas. These areas are referred to as key points of control. Facilitation through the key points of control provides a progression of movement patterns ranging from passive to active movement. The child is first prepared to move, then moved through specific normal patterns for a particular skill (ie. weight bearing, righting, etc.), then the child moves as the instructor

controls movement, and eventually the child moves without physical assistance or control.

Berta Bobath explains that:

> "The aim of Neuro-Developmental Treatment is to obtain change in postural tone and patterns towards the more normal. It cannot succeed if structural and irreversible changes in muscles, joints and soft tissues have already taken place, that is, if the condition has already become static. This may happen spontaneously in the older child or as a result of surgical procedures..... The effectiveness of Neuro-Developmental Treatment rests on bringing about changes of postural and of abnormal patterns. This cannot be done unless the degree and distribution of hypertonus is inconstant and can be changed by handling and stimulation. Neuro-Developmental Treatment exploits the great variability of patterns and postural tone and therefore can have but limited and less satisfactory results in cases where irreversible changes have already taken place" (Bobath).

On first inspection this statement appears to negate any rationale for applying neurodevelopmental treatment to the older population at Flower Hospital. Indeed, a percentage of these clients exhibit scoliosis, osteoporosis secondary to severe muscle deformities and habitual movement patterns, but a greater majority of them exhibit variability of postural tone, and considerable upper extremity and head/neck movement to warrant therapeutic intervention. If only "limited and less satisfactory results" are achieved, we are still that much closer in aiding the attainment of functional skills. It is at this point that the issue of form versus function begins to take shape, as we see the necessity for neurodevelopmental treatment but

must answer the questions how much, how often and to what goal is neurodevelopmental treatment appropriate for these clients.

Neurodevelopmental treatment is implemented at Flower Hospital on a small scale basis. Several "handling" classes have been conducted in classrooms and have been useful in demonstrating that many of the older more "involved" clients exhibit identifiable characteristics for which the concepts of inhibition and facilitation of movement are appropriate on a short-term basis. In other words, the client may perform a skill through passive facilitation of movement but never reaches that active (independent) level because their atypical movement has become habitual. Using the same example stated earlier, we may be able to inhibit the ATNR to facilitate grasping at midline (passive intervention), but as soon as we stop intervention the client uses the ATNR to grasp away from midline. However, the concept still applies, it is just a matter of determining the effectiveness per client.

In terms of assessing a client's therapeutic needs, the neurodevelopmental treatment staff devised an assessment tool (refer to next page) which fits into the hospital's documentation system of describing a client's "capabilities" and "needs," in this case in relation to NDT. The assessment clearly shows that there are enough component areas with defined needs to focus neurodevelopmental treatment on. The assessment areas of postural tone, components of movement and levels of independent functional patterns and their respective intervention approaches are in and of themselves enough to necessitate neurodevelopmental treatment.

NDT ASSESSMENT AND TREATMENT

component	"capability"	need	approach to intervention
1. tone	moderate hyper to hypo	normalization of tone	handling to include relaxation and stability
2. automatic movement patterns	labyrinthine righting oplical righting supine, prone	increase duration of motor response; develop righting on the head	handling to include tipping to side in sitting holding middle trunk; handling to include rolling holding at shoulders
3. component patterns of movement	extremes of flexion and extension	gradation though mid-ranges	slow graded progression in and out of gravity in handling, i.e., sitting
4. independent functional patterns	open mouth vocalizations inaccurate directed swipe reciprocal kicking hand opening/closing	maintain.... accurate directed swipe maintain.... maintain....	program to include weight bearing, trunk control with reach, balance reactions in extremities
5. assisted functional patterns	when placed in puppy, initiates head righting; when assisted at shoulder, rolls to side; when assisted to sit, partial head control and arms to midline at waist	increased duration of head control in sit	handling to include sidelying to sit transition, grading flexion and extension demands and back down.
6. musculo-skeletal limitations	"C" curve scoliosis sublux left hip mild elbow contractures	prevent deterioration of scoliosis increase mobility in elbows	positioning to include sidelying following normalization/elongation; investigate weight bearing status of left hip; elongation of elbow flexors
7. surgical intervention	ileo tendon band release		
8. sensory-motor organization	best mode tactile diminished proprioceptive grading vestibular deprivation hypo response to handling	increase proprioceptive grading	incorporate into dressing - changing activities graded vestibular stimulation heavy pressure to lighter

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This assessment does not account for goal-directed activity during intervention or as ultimate criterion, but it does determine what abilities a client has for functional behavior.

Form versus Function

In order to focus on form and function in relation to neurodevelopmental treatment and in relation to the clients at Flower Hospital, the two words are defined as follows:

form - any behavior performed with therapeutic intervention, eliciting normal patterns of movement, resulting in usual purposeful activity (ie. mobility on scooter board → intervention: reduce scapula/humeral tightness, facilitate abduction extension, protraction at shoulders, open hands, head in midline → bilateral arm movement for forward motion → mobility).

function - any behavior performed with therapeutic intervention, that retains an atypical pattern of movement, resulting in atypical but purposeful activity (ie. mobility on scooter board → intervention: no change in pattern → possible reciprocal arm movements with shoulder, head/neck blocks, fisted hands → staggered forward motion → mobility).

Owen White (1980) further illustrates these concepts by referring to usual form versus critical function. "Usual form" implies that a handicapped individual should perform a skill through the same motoric processes as a "normal" individual would use. "Critical function" refers to alternative patterns of movement, different from those of the "norm," that result in achieving essentially the same skill. A fairly obvious example follows:

For a "normal" twenty-six year old individual, "usual form" for grasping a spoon approximates: hand slightly supinated, with handle of spoon resting between thumb, forefinger and middle digit, utilizing a light grasp for flexibility of movement (how many of our students feed themselves grasping a spoon in this manner?). A twenty-six year old client at Flower Hospital would probably utilize some type of palmar grasp, in full pronation, using an adapted spoon handle, and a tight grip for stability of movement. One form of behavior is qualitatively different from the other but both have the same end result: self-feeding. "Critical function" attempts to define behaviors, skills, goals and objectives in terms of the purpose or function the behavior serves, as opposed to the specific form or motor act used to achieve that behavior (White,1980).

It was mentioned earlier that the hospital's ultimate goal is placement of its clients in a group or foster home. Therefore it is necessary that these clients acquire as many functional skills as possible in a short period of time. Neurodevelopmental treatment is going to play an important role in acquisition of skills, but careful consideration must be given in determining when therapeutic intervention for correct form (normal patterns of movement) must give way to acquiring functional skills even if atypical movement is the only process and can be achieved in less time. Owen White makes the distinction between efficiency and effectiveness of function. He states, "It is important that the individual accomplish the critical effect in some manner, even if that manner is highly unusual. Once the critical effect can be

achieved, emphasis is usually placed on the development of those concepts and motor behaviors that will increase the individual's efficiency" (White,1980). In many cases, the most efficient (normal) way of completing a task will not be as effective for the older Flower client.

When considering the possibility of group home placement we are concerned with the immediate usefulness of a skill to an individual in relation to making that individual more independent. In developing instructional programs for these clients do we need to spend time on training 180 degree head turning or can we teach visual discrimination with an asymmetrical head position to dominant side? Do we need to train a client to have head righting in prone if he/she exhibits good head control in sitting? Should we work on functional grasping at midline if a client continues to grasp effectively using an ATNR? Should we devote hours of therapy to independent side-sitting or should we try and facilitate upper extremity mobility? The answers to these questions depend on the individual client and the therapists or teachers orientation to programming. But in the case of over twenty-one year old deinstitutionalized individuals with a prospect for placement in group homes, the necessity for functional ability is imperative. My point (as indicated by the questions raised above) is that neurodevelopmental treatment without goal-directed activity for these clients will not help them become more functionally independent. And instructional programming without neurodevelopmental treatment intervention will decrease the possibilities for achieving functional skills. Instructional programming combined with NDT

working toward the same goals is the necessary formula for a learning process to occur. The teacher and therapist must work to achieve the same end.

The Program - NDT - Form vs. Function

At Flower Hospital we need to incorporate neurodevelopmental treatment into instructional programming for functional skills. During the "handling" classes given recently, a point was made that there isn't enough time for "hands-on" therapy intervention before positioning a client for programming or during programming because of the ratio of staff to clients and the limited blocks of time for educational instruction (two hours in the morning, one in the afternoon). But without integrating therapeutic preparation strategies with instructional programming we are not giving a client the necessary input for optimal performance of behavior. This is where NDT plays an important role. After assessing muscle tone, components of movement, the quality and quantity of movement, and independence of functional movement, we can determine how much therapy, how often, and to what goal it will be purposeful per client. A client who is severely hypertonic in the upper extremities will require facilitation of normalized tone and graded range of motion through the arms, while inhibiting a cortical thumb reflex in order to grasp a spoon.

If availablity of therapists for consistent treatment is an issue, teachers and direct care staff can (and should be) trained to provide preparation strategies before and during programs. In terms of time, therapeutic preparation strategies should be written

into the actual programs and account for a specific amount of the time for those programs.

In remembering that we are most concerned with the over twenty-one client attaining functional skills and less concerned with the actual form utilized, there is also a role for NDT. We can work on independent side-sitting with weight bearing on the left side if the client can perform a functional skill with his/her right hand (ie. grasping a brush and bringing it up to head). We can work on head righting in prone if the client is going to use a scooter board for mobility. When a client grasps an object off to the right using a reflexive ATNR, we can work on bringing that object to midline. When a client learns to visually discriminate objects on his/her dominant side, we can then work on midline orientation and finally 180 degrees.

In a sense, these examples describe neurodevelopmental treatment in a reverse order then described earlier (passive to active movement). We work on functional skills in whatever way is atypical, the client can achieve greater independence. Once the skill is achieved we can work over a period of time toward shaping better form. Owen White explains, "Use common or normal movements whenever possible, but do not hesitate to deviate from them if it will increase the chances if the individual's successful mastery of concepts" (White,1980). Neurodevelopmental treatment that is sensitive to a client's existing abilities will provide instructional programming for independent functioning.

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